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Research on the Impact of Internal Control Quality on Corporate Debt Financing Costs

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Abstract

In recent years, the instability of the international economic situation and the turbulence in China's domestic and external environments have caused a downturn in the domestic financial market, leaving enterprises facing the dilemma of "difficult and expensive financing". Therefore, based on the theories of information asymmetry, principal-agent, and signal transmission, this paper analyzes the impact of internal control quality on corporate debt financing costs, using listed companies on the Shanghai and Shenzhen A-share markets from 2019 to 2023 as samples. Empirical research finds that improving internal control quality can effectively reduce corporate financing costs. Meanwhile, from the perspectives of audit quality and nature of property rights, this paper analyzes their moderating effects on the relationship between internal control quality and corporate debt financing costs. The study reveals that the impact of internal control quality on corporate debt financing costs is more significant in enterprises with lower audit quality compared to those with higher audit quality. Furthermore, the impact is more pronounced in non-state-owned enterprises compared to state-owned enterprises. This research helps enterprises recognize the important role of internal control quality in corporate financing processes and enriches theoretical research in related fields.

Keywords

Internal Control Quality; Audit Quality; Cost of Debt Financing

1. Introduction

1.1. Research Background

In recent years, both international and domestic markets have been in a sustained downturn, and the increasing uncertainty in the external environment has led to a slowdown in domestic economic growth. In this macroeconomic situation, enterprises are facing financing difficulties, increasing the difficulty of obtaining funds, and the problem of rising financing costs is becoming increasingly prominent. According to the statistical data released by the National Development and Reform Commission of the People's Republic of China in 2024, the total increment of social financing in the first 11 months of that year reached 29.4 trillion yuan, a decrease of

4.24 trillion yuan compared to the same period in the previous year. During this period, non-financial domestic enterprises accounted for 2.9% of the total financing in the stock market, while the financing in the bond market accounted for 7.9% of the total. In addition, RMB loans accounted for 61.8% of the total financing. In the current capital raising channels for enterprises, bank credit dominates, followed closely by capital operations through the securities market. From this observation, debt based financing methods have become the preferred capital acquisition strategy for many enterprises. In order to optimize the capital structure, the central bank, together with the National Development and Reform Commission and other departments, has issued a notice on the key work of cost reduction in 2024, proposing to gradually reduce loan interest rates, strengthen the reform effect of loan market quoted interest rates and the market-oriented adjustment mechanism of deposit interest rates, with the aim of maintaining the balance of net interest margin of commercial banks while promoting the steady decline of financing costs for the whole society. Therefore, based on the guidance of national credit policies, conducting detailed research on ways to reduce financing costs has practical significance.

In 2024, regulatory agencies collaborated with relevant departments to fully implement the newly revised Securities Law and Company Law. During this period, more than 70 rules and regulations were systematically drafted and revised, thus establishing a policy document system for the capital market based on the 1+N framework. The continuous promulgation of the policy chain clearly reflects the rigorous standards of the regulatory level, covering the comprehensive regulatory field from the setting of the threshold for self issuance and listing to listed companies and industry institutions. This statement indicates that listed companies in a specific industry are about to face comprehensive regulatory constraints. In this context, enterprises need to invest in a dual strategy of reducing costs and improving efficiency to enhance their market competitiveness. Studying strategies to improve capital raising efficiency and reduce debt capital costs has become a core issue in corporate strategic planning. In 2023, the Ministry of Finance and the China Securities Regulatory Commission jointly issued the "Notice on Strengthening the Construction of Internal Control and Promoting Internal Control Evaluation and Audit of Listed Companies and Proposed Listed Enterprises", which clarified the key areas and criteria for internal control of financial reporting of listed companies, promoted the standardization of internal control audit of accounting firms, and strengthened the guidance, supervision, and management of the implementation of enterprise internal control standardization system for listed companies. This phenomenon reflects the high attention of senior financial departments to the improvement of internal control mechanisms of listed companies, which in turn promotes the optimization of internal control systems and the improvement of internal control quality, becoming a key issue that listed companies must face. At the same time, taking into account the correlation between internal control quality and corporate debt financing costs provides a theoretical basis for reducing debt financing costs by strengthening internal control quality, and further broadens the path for improving corporate debt financing conditions.

Most of the existing domestic and foreign literature on corporate debt financing is studied from the perspectives of internal and external factors such as ESG performance[1][2], digital transformation[3][4], and accounting information quality[5][6]. As a key component of internal governance in enterprises, effective operation of internal control can ensure the authenticity, reliability, legality, and rationality of accounting information, thereby alleviating information asymmetry and agency conflicts between creditors and debtors, and further affecting the debt financing costs of enterprises[7]. Therefore, this article studies the impact of internal control quality and debt financing costs. At the same time, audit quality can affect the market's confidence in internal control of enterprises, which in turn affects the financing process of enterprises[8]. Therefore, this article will analyze the moderating role of audit quality in the relationship between internal control quality and debt financing costs. In addition, due to China's unique national conditions, enterprises with different property rights face significantly different debt financing constraints[9]. Therefore, this article will also analyze the moderating role of property rights in the relationship between internal control quality and debt financing costs. Based on this, this article will study the impact of internal control quality on debt financing costs from the perspective of internal control quality, considering two moderating variables: audit quality and property rights.

1.2. Significance of the study

1.2.1. Theoretical significance

1) Supplemented and improved academic discussions on the factors influencing the cost of corporate debt financing. Previous studies have tended to conduct in-depth analysis from a comprehensive perspective of macroeconomic and microeconomic environments, as well as multiple internal and external factors of enterprises. This study adopts three dimensions of macro, meso, and micro environment to integrate and summarize. Compared with existing literature, this article particularly focuses on the role of meso environment in the cost of corporate debt financing, thus adding new perspectives to related research.

2) Facilitating the deepening and expansion of the financing theory system. Extended the relevant research in the field of internal control quality. In recent academic explorations, internal control quality has generally been used as the dependent variable to explore its interrelationships with macro factors such as ESG environment, social and corporate governance performance, and digital transformation. There are also numerous studies that consider internal control as an explanatory variable and conduct integrated analysis and research on micro level factors such as the quality of financial reporting and auditing. This study is based on the dimension of internal

control quality, and analyzes in detail its clear mechanism of action on the formation of corporate debt financing costs, thereby extending the academic exploration scope of internal control quality in the microeconomic field.

1.3. Research content and framework

1.3.1. Research contents

The structure of this paper is divided into seven parts, which are discussed in detail as follows:

First, introduction. This paper studies the initial background and significance of the topic, discusses the main content and basic structure of the research, and finally discusses the research methods adopted.

Second, related concepts and theoretical basis. Clarify the key terms and explain the theoretical framework closely related to the analysis process.

Third, literature review. This research literature review focuses on the economic consequences of internal governance quality, the influencing factors of debt capital cost, and the economic consequences of audit quality. On this basis, the research results are summarized.

Fourth, theoretical analysis and research hypothesis. This paper explores the interaction between the quality of internal control and debt financing capital, and how the quality of audit and the nature of property rights affect the relationship, and constructs relevant assumptions.

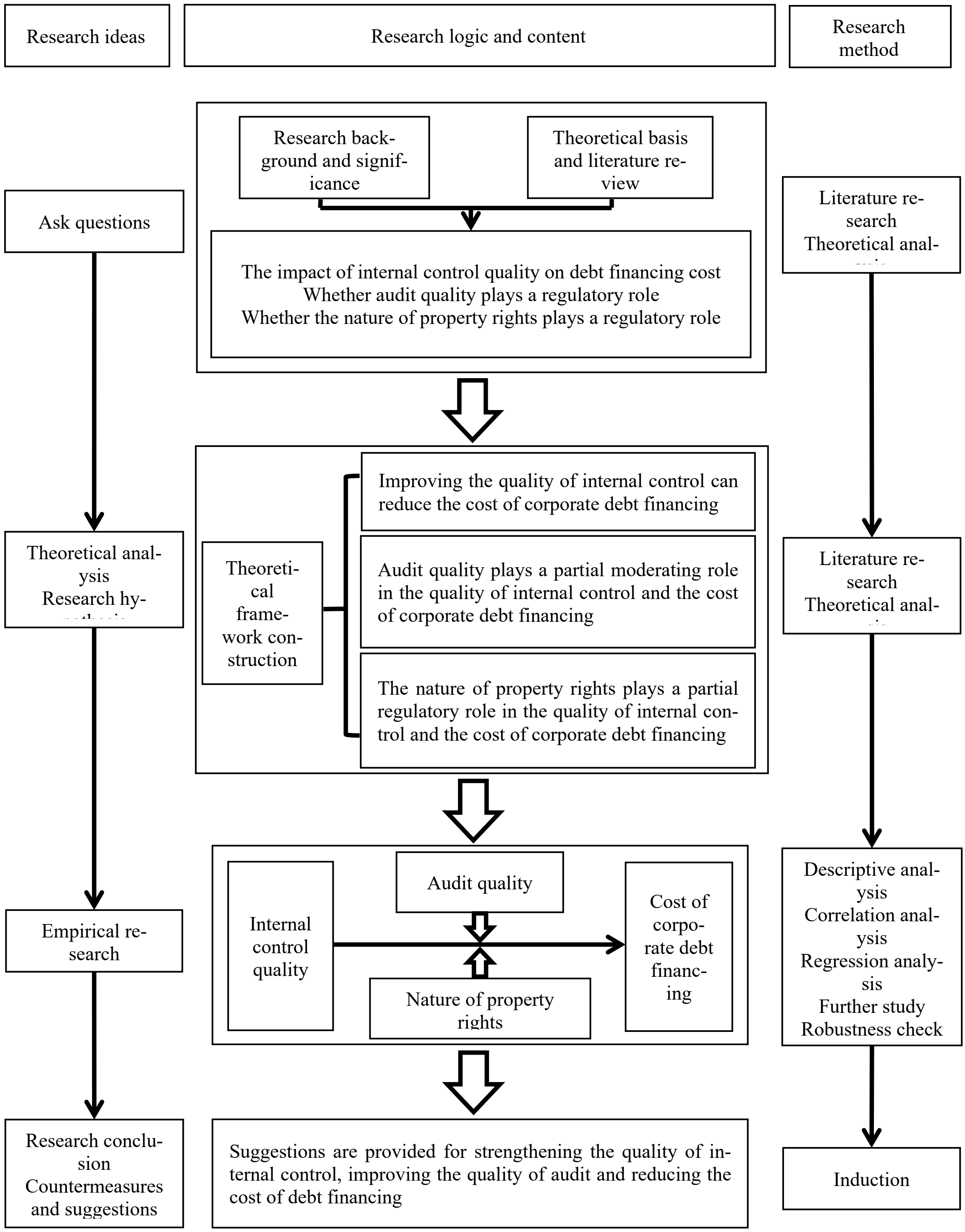
Fifth, research design. In order to provide a basis for subsequent empirical verification and interpretation of results, this paper first describes the data sources, variable definitions and model building of the research samples.

Sixth, empirical test and result analysis. In order to explore the correlation between the quality of internal control and the cost of debt financing, the regression analysis method is used to process the model to identify the specific impact path and direction between the two.

Seventh, conclusions and suggestions. The research results are explained in detail, and specific improvement strategies are proposed according to the findings.

1.3.2. Research framework

Figure 1. Research framework



1.4. Research method

According to the research questions in this paper, the following methods are mainly used:

First, literature research method. Literature research method. This study comprehensively collected, integrated and evaluated the academic materials related to audit quality, internal control quality and debt financing cost at home and abroad, aiming to orderly sort out the research progress and development trajectory in the current field, so as to realize the summary and collection of the knowledge system in this field, establish the logical framework between research subjects, and lay the foundation for the data analysis of subsequent empirical research.

Second, theoretical analysis. This study aims to analyze the internal mechanism between audit quality, property rights, internal control quality and corporate debt financing cost from the perspective of principal-agent theory, information asymmetry theory and signal transmission theory. Under the premise of profound theoretical research, the construction of directional research hypotheses is intended to build a theoretical foundation for the subsequent empirical test and guide its implementation direction.

Third, empirical analysis. Taking Shanghai and Shenzhen A-share listed companies from 2019 to 2023 as the research object, this paper uses a series of statistical methods to verify the internal relationship of variables in the same research framework, so as to verify the research hypothesis and draw the research conclusion.

2. Related concepts and theoretical basis

2.1. Related concepts

2.1.1. Internal control quality

1) Concept of internal control quality

Internal control refers to the process implemented by the board of directors, the board of supervisors, the management and all employees of the enterprise to achieve the control objectives. The objectives of internal control are to reasonably ensure the legal compliance of enterprise operation and management, to ensure the safety of enterprise assets, to ensure the authenticity and integrity of financial reports and related information, and to improve the operation efficiency and effect of enterprises, so as to promote the realization of enterprise development strategy. The quality of internal control is carried out around the effectiveness of the enterprise's internal control system to achieve the set goals. COSO's internal control framework gives an understanding from the three dimensions of operating efficiency, financial reporting reliability and compliance with laws and regulations. From the perspective of operation efficiency, high-quality internal control relies on scientific budget management, effective risk management and other means to allocate resources appropriately, improve business processes and enhance the competitiveness of enterprises. From the perspective of the reliability of financial reports, perfect internal control ensures the authenticity, accuracy and completeness of financial information by standardizing accounting, strengthening internal supervision and information disclosure, and providing decision-making basis for stakeholders. From the perspective of compliance with laws and regulations, internal control promotes enterprises to operate in compliance with laws and regulations and protects the reputation of enterprises.

2) Measurement of internal control quality

As for the measurement of internal control quality, there are mainly the following methods:

One is the evaluation report based on internal control. If the report describes the design and operation of internal control in detail, and shows that the internal control can operate efficiently in all important links, and no serious defects are detected, the quality of internal control can be judged to be high for the first time. If the report contains several cases of inappropriate design or inadequate implementation of internal control, or even detects serious defects, it indicates that the quality of internal control may be weak.

The second is the disclosure of defects in internal control. When the number of internal control defects announced by an enterprise is small, it generally indicates that the quality of internal control is relatively good. If there are many defects published, especially those related to important business processes or financial reports, it indicates that the quality of internal control is relatively weak.

Third, according to the internal control index issued by professional institutions. For example, according to the internal control index published by Dibo, the higher the internal control index, the higher the quality of internal control; On the contrary, the lower the quality of internal control.

2.1.2. Audit quality

1) The concept of audit quality

Audit quality refers to the quality of audit work and its results. It specifically involves a supervision activity that audit institutions and practitioners use appropriate audit procedures and techniques to audit the financial statements and related information of the audited entity in accordance with audit standards and relevant regulations, so as to ensure the authenticity, accuracy and credibility of the audit results, and maintain the compliance, fairness, neutrality and efficiency of the audit work. High quality audit can provide users of financial statements with authentic and credible information, enhance their trust in financial statements, help them make efficient decisions, promote the healthy and stable development of the capital market, and maintain the standardized operation of economic activities.

2) Measurement of audit quality

As for the measurement of audit quality, there are mainly the following methods:

First, the size of the firm. The "top ten" in China usually have richer professional resources, stricter quality control system and more high-quality auditors. It is generally believed that enterprises that employ "top ten" firms to audit have relatively high audit quality; If not employed, the audit quality is low.

Second, audit fees. Audit fees reveal the complexity of audit tasks and the value of auditors' professional services to a certain extent. It is generally believed that more sufficient audit fees can obtain higher audit quality, and vice versa.

Third, audit opinions. When a firm is more likely to give a non-standard audit opinion, the probability of violation audit is relatively low, and the audit procedure will be relatively more standardized, and the audit quality will be higher. Qiliang Liu et al.[10] selected audit opinion as an alternative variable in the past and found that partnership accounting firms can improve audit quality by strengthening the joint and several liability of auditors.

2.1.3. Cost of corporate debt financing

The cost of corporate debt financing refers to the cost borne by enterprises to obtain funds through debt financing. It is a key indicator in the financial management of enterprises and plays an important role in the financing decision-making and business performance of enterprises. In terms of the composition of corporate debt financing costs, it mainly covers two parts: explicit costs and implicit costs. The evaluation index of explicit cost is the ratio of interest expense to average interest bearing debt balance. The lower the ratio, the lower the debt financing cost of enterprises. The implicit cost refers to various indirect costs arising from debt financing, such as the increase in debt financing costs caused by the guarantee and mortgage provided by enterprises to obtain debt financing, more restrictions on the use of assets, the rise in financial risks caused by excessive liabilities, or the reduction of credit rating.

2.2. Information asymmetry theory

There is information asymmetry in the process of market transactions. Relevant theories show that the quantity and quality of information mastered by both parties are significantly unbalanced, and one party knows enough or accurate information resources than the other party. The uneven distribution of information is easy to cause a prominent impact on the efficiency of market trading activities.

Information asymmetry is particularly prominent in the corporate debt financing market. The management of the enterprise has an in-depth understanding of the company's operation and financial status and future development. Creditors' access to information is faced with many constraints, resulting in the inferior position of information access, and it is difficult to fully understand the true situation of the enterprise. The asymmetry of information will lead to two levels of results. The first is the phenomenon of adverse selection. Because it is difficult for creditors to accurately judge the actual risk level of enterprises, they must rely on the average risk of the market to determine the loan interest rate. This may withdraw from the market because of the increase in financing costs, while enterprises with higher risk tend to bear higher interest rates, so as to enhance the overall enterprise risk level of the market. The second is the problem of moral hazard. After obtaining debt financing, enterprises may use the insufficient information of creditors to change the established purpose of funds and engage in high-risk investment behavior, thus increasing the risk of default. The risk caused by asymmetric information often leads to creditors demanding higher risk premium in the process of loan, which leads to the rise of debt financing cost of enterprises.

2.3. Principal agent theory

Based on the actual situation of the separation of enterprise ownership and management rights, the principal-agent theory has been formed. Its core arguments involve the information asymmetry between the principal and agent, the inconsistency of the objective function and the incompleteness of the contract. Between the agent and the principal, the phenomenon of information asymmetry shows that the agent often has more abundant information resources related to enterprise management. This situation causes the client to face difficulties in supervising and evaluating the agent's behavior and performance. According to the unbalanced information, the agent may ignore the rights and interests of the principal in decision-making due to the promotion of personal interests. The principal pursues the maximization of enterprise value and the growth of long-term shareholder wealth, while the agent tends to optimize personal welfare, such as salary promotion and position promotion. This difference causes the agent's behavior to go against the principal's expectations. The incompleteness of the contract is due to the lack of a complete contract including all possible situations and clear rights and obligations of both parties. There may be loopholes, ambiguities or unforeseen circumstances in the contract, which provides the agent with the space for opportunistic behavior.

In the operation of enterprises, the separation of ownership and management rights has given birth to a special entrustment relationship, which is accompanied by several challenges: on the one hand, managers have more information about the operation of enterprises, so they may use their own information advantages to make on-the-job consumption or blind investment, or be indifferent to enterprise affairs, and present false performance, thus damaging the interests of shareholders. The effective way to deal with this problem is to use the incentive mechanism. On the other hand, when applying for loans to creditors, enterprises may conceal the relevant risks of relevant enterprises, thereby damaging the interests of creditors. At the same time, creditors may increase the debt financing cost of enterprises by adding restrictive clauses, raising loan interest rates and other means to avoid losses. The effective way to deal with such problems is to improve the information disclosure and audit quality of enterprises, so as to strengthen the trust of creditors. The principal-agent problem is one of the main causes of audit.

2.4. Signal transmission theory

The theory holds that in market transactions, the party with information advantage will take some observable actions or send specific signals in order to show the real situation or advantages to the party with information disadvantage. These signals need to have certain characteristics, so that market participants with different characteristics have different costs to send signals, so as to ensure that the signals can effectively distinguish different types of participants. For example, when raising debt, enterprises can disclose the quality of internal control and audit to convey their credit rating and risk level to creditors, so as to reduce costs and improve the possibility of obtaining external funds.

3. Literature review

3.1. Research on the economic consequences of internal control quality

As for the relevant research on the economic consequences of the quality of internal control, the path commonly adopted by the academic community at this stage is to analyze the characteristics of the quality of internal control. Some researchers also discuss the economic consequences from the perspective of internal and external environmental factors of enterprises. In this context, this study deepens the exploration and focuses on the internal control quality in two dimensions: audit quality and corporate debt financing cost.

In terms of audit quality, the research of Ke Yu[11] shows that the internal control system has a positive effect on audit quality. The perfect internal control system not only reduces the operational risk of enterprises, but also ensures the credibility of financial reports. Wenhuan Liu and Yuxin Wang[12] found that the audit quality could be efficiently optimized by enhancing the implementation of internal control. Shiyun Liao[13] stressed that a sound internal control system can enhance the trust of external investors in the enterprise, thus further improving the audit quality. Datsenko[14] stressed that the internal control mechanism of the enterprise can help auditors better understand the potential risks in the operation of the enterprise, and improve the accuracy of the audit report on this basis. Lei Wang[15] noticed that the information uncertainty of enterprises with poor internal control quality is large, which may increase the risk of accounting firms issuing inappropriate audit opinions. At the same time, Yong Wu et al.[16] pointed out that the more perfect the internal control system and the internal supervision mechanism, the higher the quality of financial reports, which can reduce the difficulty of audit. Therefore, Qixiang Gao[17] believes that enterprises should constantly improve the design of internal control system to ensure that it is in line with the actual situation, so as to strengthen the rationality and effectiveness of internal control system and improve the audit quality of financial statements.

In terms of the cost of corporate debt financing, the research results of Meng Li et al.[18] show that improving the quality of internal control can help reduce the potential risk of corporate debt default. The study further elaborated that if an enterprise optimizes its internal control system, it will enhance the effectiveness and rationality of its operation and investment decisions, strengthen the capital base and solvency of the enterprise, and ultimately reduce the risk of debt default. Su Hu's[19] research results reveal that a sound internal control mechanism helps to optimize the operating atmosphere of enterprises and improve management efficiency, while transmitting a positive signal to the capital market, reducing the risk of creditors' investment, thereby reducing the cost of debt financing for enterprises. Rong Qiao's[20] research shows that when the quality of internal control of an enterprise declines, the internal contradictions of the enterprise will be strengthened, which may have a negative impact on the creditors' investment confidence in the enterprise. In order to ensure the robustness of enterprise operation, we must strengthen the quality of internal control mechanism to reduce the probability of potential risks in the operation process, so as to reduce the economic burden of enterprise debt financing. Jieliu Peng and Heshu Huang[21] put forward in their research that an excellent internal control system constitutes the fundamental guarantee for the accuracy of enterprise financial reporting, which helps to improve the operation efficiency of enterprises, and thus promote enterprises to obtain more favorable conditions when signing debt agreements with financial institutions. The research of Yazhou Zhang[22] reveals that the improvement of internal control mechanism can effectively promote the promotion of enterprise value by reducing the cost of corporate debt financing. Hanwen Chen et al.[23] revealed that under the premise of the efficient implementation of the internal control mechanism, the stability of the credit market will be significantly enhanced and its healthy development will be promoted, which will lead to the corresponding reduction of the cost of corporate debt financing. Zhiyong Xu, Ze Song and Jijun Zhu [24] believe that strengthening the quality of internal control will give enterprises the flexibility to adjust costs to cope with the fluctuations of the external environment. This will help managers develop accurate resource allocation and cost control strategies based on overall interests.

3.2. Research on the Factors Influencing the Cost of Corporate Debt Financing

After a thorough understanding of relevant academic literature at home and abroad, it can be seen that the academic community mainly explores the influencing factors of corporate debt financing costs from both macroeconomic and microeconomic perspectives, using a multidimensional analysis framework. This article aims to comprehensively analyze and explore the overall environment of enterprises from three dimensions: macro, meso, and micro.

At the macroeconomic level, the process of building China's tax system shows that through the reform of the income tax management system, the difficulty of corporate tax avoidance behavior has increased, which directly leads to a decrease in internal cash flow of enterprises. At the same time, the demand for external funds by enterprises has correspondingly increased, resulting in an upward trend in the cost of debt financing for enterprises. Chang Cai et al.[25] revealed that strengthening tax administration can significantly alleviate the problem of information asymmetry between creditors and debtors, thereby effectively curbing the occurrence of agency conflicts. This process ultimately leads to a reduction in the cost of corporate debt capital. Qingyuan Li et al.[26] observed that when the expected inflation rate shows an upward trend, the actual cost of financing through debt for enterprises decreases accordingly, which in turn prompts banks to expand their loan quotas for enterprises. The results of Peibo Xie et al.[27] show that an overall monetary strategy can have an impact on the total amount of currency output by the central bank, which is further reflected in the fluctuation of interest rates and ultimately has occasional effects on the debt financing costs borne by enterprises. Guoyun Shen[28] found that in economically developed regions, the gathering of numerous enterprises has intensified competition in the financing market, leading to a significant increase in the cost of corporate debt financing. Xianbing Zhong [29] found that after the implementation of green credit policies, financial institutions increased the difference in loan interest rates when implementing credit strategies for heavily polluting enterprises. This measure significantly increased the cost of raising funds through debt for enterprises, thereby exerting a significant constraint on their financing behavior.

In the meso environmental analysis, Boubaker et al.[30] found that if a company has a dominant position in the product market, it is beneficial to reduce the cost burden of debt financing. Dhaliwal's[31] study found that as the threat level from potential market entrants and industry competitors increases, the stability of the business environment faced by enterprises improves, leading to an increase in the robustness of accounting information. This phenomenon ultimately promotes a decreasing trend in debt financing costs. In Jagtiani and Lemieux's[32] study, it was pointed out that through digital financial means, the information between the demand and supply sides of debt financing can be quickly connected, thereby expanding a wider range of financing channels for enterprises and helping to reduce the overall cost of debt financing. Peibo Xie et al.[27] found that with the rise of financial technology, competition between banks and other financial institutions has become increasingly fierce. This phenomenon has stimulated these institutions to comprehensively collect and analyze enterprise data, effectively alleviating the problem of information imbalance with enterprises, and thereby promoting a slight reduction in the cost of corporate debt financing. In Yunxiao Xu's[33] research findings, it is emphasized that as enterprises undergo deep digital transformation, their proportion of existing funds is correspondingly increased. This phenomenon not only occupies the short-term financial resources used by enterprises for production and operation, but also easily conflicts with the interests of creditors. External investors usually demand higher risk premiums in order to protect their own interests, which in turn leads to an increase in the cost of corporate debt financing.

In terms of microenvironment, the study by Lisha Jiang et al.[34] shows that key factors such as enterprise characteristics such as size, debt level, profitability, growth potential, and tangible assets significantly affect the cost of debt financing for enterprises. The study by Hongda Ren and Kun Wang[35] suggests that senior managers have a more solid academic background, which corresponds to the improvement of accounting conservatism and internal governance structure, thereby promoting the accuracy of corporate information disclosure and efficiently reducing the cost burden of debt financing. The research results of Jingru Huang and Haoxuan Li[4] indicate that improving corporate transparency is beneficial for enhancing potential creditors' understanding of the company, reducing information asymmetry, and effectively reducing the cost of debt financing for companies in the capital market. Wenyan Wang et al.[36] revealed that the disclosure of enterprise data assets has a significant effect on enhancing the accuracy of financial analyst forecasts and reducing the possibility of debt defaults, thereby effectively reducing the cost of debt capital. The research results of Shijun Zhao et al.[37] indicate that adopting efficient market value management strategies such as equity incentive mechanisms can be effective in improving information transparency and reducing operational risks, thereby achieving the goal of reducing debt financing costs. The study by Yali Mei et al.[38] suggests that companies exhibiting excellent ESG performance can significantly enhance their information transparency, thereby reducing information asymmetry issues. This allows creditors to have deeper insights into the company, thereby reducing the cost of debt financing. The study by Dongwei Su and Haijian Zeng[39] pointed out that companies with higher internal control quality often demonstrate higher information authenticity in their public financial reports, accompanied by an improvement in corporate reputation, which in turn leads to a corresponding reduction in the cost of raising debt funds. Yudong Guo and Yang Hong's[40] study suggests that companies can enhance the trust of relevant stakeholders, build a positive public image, and improve the reputation of the company by publicly disclosing positive information through audit reports. Such measures promote enterprises to raise capital more efficiently and increase their likelihood of obtaining debt financing.

3.3. Research on the economic consequences of audit quality

At present, the measurement of audit quality, through combing the past literature, this paper will review the economic consequences of audit quality from two aspects of content quality and disclosure quality.

From the perspective of content quality, the research results of Dengjin Zheng and

Tianyi Yan[41] revealed that, relying on the signaling theory, the high-quality audit report provided by auditors can convey positive information about the efficiency of enterprise information disclosure to creditors. Such information enhances the creditor's trust in the information provided by the enterprise, helps it identify the enterprise with high quality of financial information, so as to reduce the degree of information asymmetry between the two sides, and ultimately reduce the cost of debt financing. The research results of Qiusheng Wu et al.[42] show that in the audit process, improving the audit quality will effectively reduce the inconsistency of key audit matters. Xu et al.[43] found that good audit quality can significantly improve information transparency, which makes it easier to expose the self-interest trend of internal individuals such as senior managers and major shareholders. This process correspondingly increases the economic cost of interest encroachment, thus effectively curbing their interest plundering behavior. Mansi[44] proposed in his research that the characteristics of auditors were analyzed in depth, and pointed out that the two key elements of audit quality and auditor tenure could be identified by creditors, thus significantly reducing the cost burden of debt capital. Mingcherng[45] revealed that external audit has a significant warning effect on enterprises, which can effectively prevent the high-risk investment made by the management for private interests, and significantly reduce the negative impact of adverse selection and moral hazard on debt financing costs.

From the perspective of disclosure quality, Robin et al.[46] pointed out that auditors with excellent professional quality can significantly improve the quality of enterprise information disclosure and effectively reduce the possibility of debt default by virtue of their professional knowledge and skills. This perception has led enterprises to reduce restrictions on terms in the process of signing debt contracts, thus creating a more favorable financing environment for debt capital raising. Chun Cai et al.[47] used the ranking of auditors as the evaluation standard of audit quality, and discussed whether companies with multiple major shareholders tend to employ better quality auditors. High standards of audit quality can significantly reduce the risk of information asymmetry, thus improving information transparency. Meiwen Bu[48] pointed out that if an enterprise has the characteristics of accounting integrity, it is more inclined to adopt high standard audit services. This behavior strengthens its obvious signal transmission function, so as to improve the attention and cognition of relevant stakeholders to the enterprise. This mechanism helps stakeholders to clearly identify the accounting behavior of integrity and dishonesty, and effectively reduce the risk of information inequality and adverse selection caused by accounting integrity as an informal system. Zhihua Wei et al.[49] found that the financing cost of enterprises receiving standard audit opinions is lower than that of enterprises receiving non-standard audit opinions. Chen et al.[50] found that enterprises with flawed audit opinions in the previous year will encounter more stringent conditions when applying for financing this year, such as the reduction of financing scale and the increase of limited amount. The research conclusion of Peter et al.[51] shows that if other companies obtained standard audit opinions in the previous year, the financing interest rate of the companies that issued non-standard audit reports this year will be about 17% higher when financing.

3.4. Literature review

Through the systematic synthesis of existing literature, researchers have analyzed the economic consequences of internal control quality from many aspects, including the positive effect of improving internal control quality on audit quality and the positive effect on reducing debt financing costs. Academic research on debt financing costs has also made significant progress. Scholars have conducted a detailed investigation on the factors affecting the cost of debt financing from different levels, covering the tax policy and monetary strategy at the macro level, the industry competition situation at the meso level, the effect of digital finance, and the enterprise size and accounting conservatism at the micro level. Looking at the existing academic research, we can find that the discussion on the cost of debt financing seems slightly inadequate compared with other dimensions such as the scale and term structure of debt financing. The purpose of this study is to explore the correlation between the quality of internal control and the cost of corporate debt financing, and further enrich the content of relevant academic fields. In the current academic field, the discussion on the relationship between audit quality, internal control quality and debt financing cost is insufficient. Based on the existing research, this study integrates the concept of audit quality into the theoretical model of internal control quality and corporate debt financing cost, aiming to analyze how internal control quality affects corporate debt financing cost, so as to expand the path exploration and theoretical depth of internal control quality in improving the rationality of financing decision.

4. Theoretical analysis and research hypothesis

4.1. Research on internal control quality and debt financing cost

The cost of corporate debt financing is a key factor for enterprises to consider in debt financing activities. As the cost of using debt funds, it is not simply determined by a single factor, but is affected by many complex factors. In the actual financial market environment, creditors usually determine the cost of corporate debt financing based on a series of strict and comprehensive evaluation indicators, which cover the key elements of multiple accounting levels such as the solvency, profitability and development potential of the enterprise.

From the perspective of information asymmetry and principal-agent theory, internal control has a significant inhibitory effect on violations in financial reports through effective supervision, thus promoting the improvement of the quality and transparency of accounting information. The transmission of reliable and high-quality information to creditors can improve information asymmetry and reduce investors' risk expectations. Investors are willing to provide loans at a lower interest rate, which reduces the cost of corporate debt financing[52]. Within the information asymmetry between debtors and creditors, the latter generally need to rely on indirect means such as financial statements to collect information about business operations. Such information may contain inherent flaws, especially when there are problems in the financial statements issued by enterprises, which will have a significant effect on the accuracy of creditors' Evaluation on the risk of corporate debt default, and make the error of evaluation results increase. The effectiveness of the internal control mechanism, with the help of strengthening the internal governance structure, makes the information transparent and clear[53], so as to reduce the increase in debt financing costs caused by the information asymmetry between creditors and debtors, and thus promote the smooth development of investment and financing activities in the capital market[54]. To sum up, by alleviating information asymmetry and agency costs, the improvement of internal control quality can effectively reduce the cost of debt financing.

From the perspective of enterprise risk, improving the level of internal control is conducive to reducing the risk and information inequality in enterprise operation. In terms of the cost of debt capital, this cost reflects the lender's assessment of the borrower's operational risk and information inequality, and it is the use cost that the enterprise needs to bear to obtain debt capital. When the efficiency of the internal management mechanism of enterprises is improved, the uncertainty and potential credit risk faced by financial institutions as fund providers are reduced accordingly. Therefore, the financial institutions will reduce the debt financing cost of enterprises accordingly[55]. The efficiency of the internal control mechanism plays a significant role in the continuity and efficiency monitoring of management behavior, which promotes the investment behavior of enterprises to meet the requirements of laws and regulations, significantly reduces the probability of managers' making opportunistic choices, and effectively inhibits the implementation of high-risk investment behavior. Debt equity holders will receive a security signal, thereby reducing the demand for risk premium compensation[52]. To some extent, the financing restrictions suffered by enterprises reflect the difficulty of obtaining external funds. The increased financing restrictions of enterprises mean that the difficulty of obtaining external funds increases accordingly[56]. Faced with stricter financing restrictions, enterprises may have to bear greater costs if they attempt to raise funds from the outside world. The improvement of the internal control mechanism is positively related to the operation comprehensiveness, which can directly promote the optimization of the management system, reduce the potential risk probability in the operation process, and enhance the overall development strength of the enterprise. This positive effect will ultimately be significantly reflected in the control of the cost of corporate debt financing to achieve effective cost management. To sum up, this

paper proposes hypothesis 1:
H1: Improving the quality of internal control can reduce the cost of corporate debt financing.

4.2. Research on audit quality, internal control quality and debt financing cost

Audit quality is closely related to the quality of financial information content and disclosure, and is an important performance of supervising the work results of enterprises. As the "quality inspector" of financial statements, audit can sensitively detect the errors and loopholes in the financial statements of listed companies by virtue of professional audit procedures and rigorous working attitude, and ensure the quality of audit work from the perspective of supervising internal control and participating in corporate governance.

From the perspective of internal control, as an economic supervision activity, the core responsibility of audit is to comprehensively verify and verify the enterprise's financial statements and internal control[57]. The independence of internal audit can improve the effectiveness of internal control. Auditors can audit the business more impartially and fairly, find out the existing risks more accurately, and then put forward suggestions for improvement[58]. When the audit quality is at an excellent level, it means that the financial information presented by the enterprise has authenticity and credibility, and the internal control is appropriate and efficient[59]. The implementation of high-level audit work can make the true and credible financial data of the enterprise transparent to the stakeholders of the enterprise, and significantly improve the information transparency. In this process, the phenomenon of false statements and financial fraud can be effectively suppressed, and various risks can be reduced, so as to build a good external environment for enterprises to achieve high-level development. A high level of audit can ensure the comprehensive and accurate accounting information and reduce information imbalance and agency problems[60].

From the perspective of corporate governance, high-quality audit can bring many positive effects to enterprises. It helps to enhance the image and credibility of enterprises in the capital market, and makes enterprises more attractive in the debt financing market. By reducing information asymmetry and agency costs and enhancing the quality of internal control, it actually reduces the cost of debt financing for enterprises. This series of chain reactions completely shows that when the quality of accounting information of enterprises is at a high level, the situation of information asymmetry will be significantly optimized, and the information risk will be reduced. In view of this, the risk premium required by external investors will also be reduced accordingly, thus reducing the debt cost of enterprises[61]. It can be seen that the level of enterprise risk-taking is the core standard to measure the cost of debt financing. If the level is high, it means that the future income of the enterprise may be insecure. In this case, creditors will increase the cost of debt financing based on this high-risk situation[62]. At the same time, high-quality internal control can not only improve accounting conservatism[63], but also improve the quality of internal control through the whole process control mode of ex ante detection, in-process monitoring, ex post evaluation and improvement, so as to send a positive signal to the capital market through low risk to reduce debt financing costs. After the above theoretical analysis, this paper proposes hypothesis 2:

H2: Compared with listed companies with higher audit quality, the impact of internal control quality of listed companies with lower audit quality on corporate debt financing cost is more significant.

4.3. Research on the nature of property rights, the quality of internal control and the cost of debt financing

Due to China's special economic environment, that is, the economic mechanism with the public ownership economy as the main body, the state-owned economy occupies a pivotal position in China's market economy. The differences between state-owned enterprises and non-state-owned enterprises are as follows: first, the ownership of state-owned enterprises belongs to the state, and the property right structure is relatively centralized, while the ownership of non-state-owned enterprises belongs to non-state subjects, and the property right structure is more diversified; Second, the management goal of state-owned enterprises is not only to pursue economic benefits, but also to consider social, national and other public policy goals, while non-state-owned enterprises focus more on reducing costs and increasing efficiency to maximize economic benefits; Third, in terms of government regulation, state-owned enterprises are more regulated by government departments than non-state-owned enterprises; Fourth, in terms of internal control mode, the internal control system of state-owned enterprises is more perfect than that of non-state-owned enterprises, the implementation of internal control is more strict, and the quality of internal control is higher.

Due to the supervision of the administrative department, the operation behavior of state-owned property companies is related to the purpose and rights of the administrative department, so the reliability and standardization of their financial information are generally higher than those of non-state-owned property companies. Therefore, creditors will pay more attention to the internal control ability of non-state-owned property companies in order to reduce agency costs and alleviate the degree of information asymmetry[64]. The cost of corporate debt financing is affected by the quality of internal control, and the two are significantly negatively correlated, and this relationship is closely related to the nature of the company's property rights, which is more significant in non-state-owned holding enterprises than in state-owned holding enterprises[65]. If listed companies want to reduce debt financing constraints, they must solve the problem of low quality of internal control, that is, the better the quality of internal control, the less debt financing constraints. At the same time, after considering the nature of property rights, this conclusion is more prominent in non-state-owned enterprises[66]. Therefore, compared with state-owned enterprises, creditors will pay more attention to the internal control quality of private enterprises. Based on this, this paper proposes hypothesis 3:

H3: Compared with state-owned enterprises, the internal control quality of non-state-owned enterprises has a more significant impact on the debt financing cost of enterprises.

5. Research design

5.1. Sample selection and data sources

The research samples of this paper are from the valid data of China's Shanghai and Shenzhen A-share listed companies from 2019 to 2023. The screening principles are as follows: 1) eliminate the listed companies of Finance and insurance; 2) Eliminate abnormal data and St enterprises; 3) Eliminate enterprises with incomplete or unrecognizable financial data; 4) Companies with zero interest on interest free loans are excluded; 5) Eliminate samples with a debt ratio greater than 1; 6) Eliminate the enterprises that lack the measurement of Dibo internal control index. Finally, 11754 valid data were obtained. In terms of data sources, this paper uses the internal control index of Dibo version to evaluate the quality of enterprise internal control, and the financial and non-financial data of the sample are from guotai'an database. The data preprocessing and analysis are completed by Excel and stata17.0 software, in which Winsor tail reduction of 1% is applied to continuous variables to ensure statistical robustness.

5.2. Research variables

5.2.1. Explained variable

The explanatory variable of this paper is the cost of debt financing (COST), which is measured by the research design of Lei Wang[67], that is, the debt financing cost is estimated by the ratio of annual interest expenditure to the total amount of interest bearing liabilities, including long-term borrowings, short-term borrowings, bonds payable and non current liabilities due within one year. The larger the index, the higher the cost of debt financing. This method is relatively comprehensive. It not only takes bank claims into account, but also covers bonds issued by enterprises and other interest bearing liabilities. It is a more scientific method in the current related research.

5.2.2. Explanatory variable

The explanatory variable of this paper is the quality of internal control (IC), which is quantified by using the internal control index of Dibo version, following the method of Jun Xiao[64]. After logarithmic conversion, the internal control index is used for analysis. An increase in its value indicates that the quality of internal control has been improved accordingly.

5.2.3. Adjusting variable

The moderating variables of this paper are audit quality (AQ) and property right nature (state), and this variable is measured by referring to the research of Qingqing Dai [8]. Select whether the auditors are from the "top ten" accounting firms to measure the audit quality. If the audit firms of listed companies belong to the "top ten", the value is 1; If it does not belong to, the value is 0. Take 1 for state-owned listed companies and 0 for non-state-owned listed companies.

5.2.4. Control variable

In the in-depth analysis of the determinants of debt financing costs of listed companies, this study adopts a diversified perspective, considering the agency indicators of internal control quality, audit quality, and other key variables that affect debt financing costs. Based on the literature of Jianping deng[68], Hanwen Chen and Zhongsheng Zhou[23], Yanchao Feng and Lizhen Lai[69], this study controls the following key influencing factors: enterprise size (SIZE), asset liability ratio (LEV), return on assets (ROA), cash flow adequacy (CFO), growth (GROWTH), nature of property rights (STATE), and total asset turnover (TAT). And control industry (IND) and year (YEAR). The specific variable definitions are shown in the table below:

Table 1. Variable definition

Variable	Variable symbol	Variable name	Variable definition
Explained variable	COST	Debt financing costs	Enterprise interest expense/annual interest bearing liabilities
Explanatory variable	IC	Internal control quality	The internal control index of Dibo version takes ln value
Adjusting variable	AQ	Audit quality	If it is the top ten audit, it is 1, otherwise it is 0
	STATE	Nature of property rights	Take 1 for state-owned listed companies, otherwise take 0
Control variable	SIZE	Enterprise size	Ln value is taken as the total assets of the company
	LEV	Asset liability ratio	Total liabilities at the end of the year/total assets at the end of the year
	ROA	Return on assets	Net profit/total assets
	CFO	Cash flow adequacy	Net operating cash flow/total assets
	GROWTH	Growth	Expressed by the growth rate of operating revenue
	STATE	Nature of property rights	Take 1 for state-owned listed companies, otherwise take 0
	TAT	Total asset turnover	Net operating income/average total assets
	IND	Industry	Virtual variable of the industry in which the listed company is located
	YEAR	Year	Annual dummy variable

5.3. Research model

In order to test hypothesis 1, this paper constructs the following model:

$$COST = \alpha_0 + \alpha_1 IC + \alpha_2 SIZE + \alpha_3 LEV + \alpha_4 ROA + \alpha_5 CFO + \alpha_6 GROWTH + \alpha_7 STATE + \alpha_8 TAT + \alpha_9 \sum IND + \alpha_{10} \sum YEAR + \varepsilon \quad (1)$$

Among them, the coefficient in model (1) reflects the effect of internal control quality on corporate debt financing cost. If the coefficient is negative, assuming that H1 is verified, the quality of internal control has a negative impact on the cost of corporate debt financing.

Hypothesis 2 also uses the above model to conduct audit quality grouping research. If the significance of the low audit quality group is higher than that of the high audit quality group, it is assumed that H2 is verified. Compared with the high audit quality enterprises, the impact of the internal control quality of the low audit quality enterprises on the debt financing cost of enterprises is more significant.

To test hypothesis 3, this paper constructs the following model:

$$COST = \beta_0 + \beta_1 IC + \beta_2 SIZE + \beta_3 LEV + \beta_4 ROA + \beta_5 CFO + \beta_6 GROWTH + \beta_7 TAT + \beta_8 \sum IND + \beta_9 \sum YEAR + \varepsilon \quad (2)$$

The above model is used to study the grouping of property rights. If the significance of the non-state-owned enterprise group is higher than that of the state-owned enterprise group, it is assumed that H3 is verified. Compared with the state-owned enterprise, the internal control quality of the non-state-owned enterprise has a more significant impact on the debt financing cost of the enterprise.

6. Empirical test and result analysis

6.1. Descriptive analysis

The descriptive statistical results of each variable are shown in Table 2. The data shows that the average value of the index to measure the cost of debt financing (COST) is 0.056, and the median is 0.044, which is greater than the median, indicating that the cost of debt financing of some enterprises is higher than the average level, leading to a larger average; The index to measure debt financing cost is between 0.014 and 0.198, and the standard deviation is 0.041, with relatively large fluctuations. It can be seen that the cost situation faced by enterprises in debt financing is uneven.

The average of the indicators measuring the quality of internal control (IC) in the table is 6.477, with a median of 6.490, which is less than the median, indicating that some enterprises' internal control efficiency is lower than the overall average level, and their quality is relatively low; The minimum value is 6.271 and the maximum value is 6.623, which indicates that although there are differences in internal control quality among the company groups studied, the degree of difference is not significant.

The average value of the index measuring audit quality (AQ) in the table is 0.605, which means that about 61% of the companies in the sample range selected the top ten accounting firms in the industry, indicating that most companies obtained relatively high audit quality. The index value is limited to the range of 0 to 1, with a median of 1. To a certain extent, this reflects that the effects of the third-party independent audit methods adopted by the companies in the sample are quite different. Although more than half of the companies choose firms with high audit quality, some companies still choose firms that do not meet the standards of expertise in the industry, resulting in uneven overall audit effects. The standard deviation is 0.489, which further indicates that the dispersion of the external audit quality around the mean value of each company is large, and the audit quality differences between different companies are obvious.

Table 2. Descriptive statistics of main variables

Variable	Sample size	Mean value	Standard deviation	Minimum value	Median	Maximum
COST	11754	0.056	0.041	0.014	0.044	0.198
IC	11754	6.477	0.09	6.271	6.490	6.623
AQ	11754	0.605	0.489	0.000	1.000	1.000
SIZE	11754	22.797	1.225	20.933	22.628	25.392
LEV	11754	0.463	0.176	0.164	0.460	0.779
ROA	11754	0.034	0.046	-0.073	0.033	0.122
CFO	11754	0.056	0.055	-0.045	0.054	0.167
GROWTH	11754	0.095	0.225	-0.298	0.072	0.619
STATE	11754	0.397	0.489	0.000	0.000	1.000
TAT	11754	0.638	0.355	0.144	0.575	1.493

6.2. Correlation analysis

In this paper, the preliminary judgment results are obtained by correlation analysis before more accurate regression analysis. According to the data in Table 3, when the significance level is set at 0.01, there is a correlation between the quality of internal control and debt financing costs, and there is a reverse relationship, with a correlation coefficient of -0.087, $p < 0.01$， This further verifies the relationship between the two in hypothesis 1. There is also a correlation between audit quality (AQ) and debt financing cost (COST). The value of the correlation coefficient is -0.046. From the perspective of numerical symbols, the relationship between the two is reverse. However, it should be noted that although there is a reverse relationship, the relationship may not be robust in some aspects, perhaps because the role of other relevant control variables was not fully considered in this bivariate correlation analysis, which led to such operation results. It can also be seen from the table that the correlation between other control variables and debt financing costs is basically in line with the expected situation. The correlation of individual variables may be different and may be affected by other factors. In addition, since the maximum determination value of the correlation coefficient of all variables is only 0.446, which is far from the level that may cause serious collinearity problems, it can be concluded that the model used in this study does not have obvious collinearity problems

Table 3. Correlation analysis

	COST	IC	AQ	SIZE	LEV	ROA	CFO	GROWTH	STATE	TAT
COST	1									
IC	-0.087***	1								
AQ	-0.046***	0.104***	1							
SIZE	-0.130***	0.236***	0.116***	1						
LEV	-0.179***	-0.001	-0.006	0.446***	1					
ROA	0.028***	0.390***	0.115***	0.053***	-0.379***	1				
CFO	0.120***	0.181***	0.083***	0.071***	-0.186***	0.491***	1			
GROWTH	-0.039***	0.336***	0.032***	0.057***	0.050***	0.312***	0.097***	1		
STATE	-0.035***	0.093***	0.000	0.360***	0.217***	-0.090***	-0.056***	-0.023**	1	
TAT	0.017*	0.288***	0.063***	0.00100	0.078***	0.252***	0.194***	0.207***	-0.070***	1

Note: ****, * *, and * represent significance levels of 1%, 5%, and 10%, respectively.

6.3. Regression analysis

6.3.1. Regression analysis of the impact of internal control quality on debt financing cost

Table 4 shows the regression results of the impact of internal control quality on debt financing costs. It can be seen that the coefficient of internal control quality (IC) is -0.0164, and it is significant at the level of 1% (t value is -3.51), which confirms hypothesis 1, that is, the improvement of internal control quality is negatively correlated with the decline of debt financing costs. The sound internal control system has effectively alleviated the agency contradiction between creditors and senior managers, reduced the degree of information inequality, and promoted the reduction of enterprise operation risk. Such a mechanism protects the interests of creditors and enhances their sense of trust in enterprises. Therefore, it significantly reduces the cost of debt financing for enterprises.

Table 4. Regression results of the impact of internal control quality on debt financing costs

Variable	COST
CONSTANT	0.405***
	(8.50)
IC	-0.0164***
	(-3.51)
SIZE	-0.00951***
	(-5.83)
LEV	-0.0616***
	(-10.84)
ROA	-0.0326**
	(-2.56)
CFO	0.111***
	(14.60)
GROWTH	0.00522***
	(2.95)

STATE	0.00283
	(0.89)
TAT	-0.00549*
	(-1.80)
IND	Yes
YEAR	Yes
N	11754
Adj. R^2	0.0591

Note: same as above.

6.3.2. Regression analysis of internal control quality and debt financing cost under different audit quality

Table 5 groups the sample listed enterprises. If the enterprises are audited by the top ten accounting firms, they are classified into the high audit quality group; On the contrary, they are classified into the low audit quality group.

According to the regression results in the table, in the high audit quality group, the impact of enterprise internal control quality on debt financing cost is negatively correlated, with a coefficient of -0.00651, but not significant (t value is -1.06). This shows that in enterprises with high audit quality, the improvement of internal control quality has no obvious effect on the reduction of debt financing cost. In the low audit quality group, the quality of internal control and debt financing cost showed a significant negative correlation (significance level was 1%), and the coefficient was -0.0282 (t value was -3.52). This shows that in enterprises with low audit quality, the improvement of internal control quality has a significant effect on the reduction of debt financing cost. Hypothesis 2 is verified. It is concluded that when examining the financial situation of enterprises with low audit quality, we can observe that the effectiveness of audit activities in the audit of financial statements and the supervision function of management is weaker than those enterprises with high audit quality. In view of this, enterprises can effectively reduce the cost of debt financing by strengthening the internal control system that complements the audit quality. Therefore, especially in enterprises with low audit quality, the impact of strengthening internal control on reducing debt financing costs is more prominent.

Table 5. Regression results of internal control quality and debt financing cost under different audit quality

Variable	（1）	（2）
	High audit quality	Low audit quality
CONSTANT	0.273***	0.573***
	(4.21)	(6.85)
IC	-0.00651	-0.0282***
	(-1.06)	(-3.52)
SIZE	-0.00641***	-0.0139***
	(-2.82)	(-4.84)
LEV	-0.0613***	-0.0569***
	(-8.15)	(-5.81)

ROA	-0.0261	-0.0279
	(-1.51)	(-1.33)
CFO	0.115***	0.100***
	(11.35)	(7.78)
GROWTH	0.00441*	0.00382
	(1.90)	(1.26)
STATE	0.000772	0.00602
	(0.16)	(1.18)
TAT	-0.0101**	0.000646
	(-2.49)	(0.12)
IND	Yes	Yes
YEAR	Yes	Yes
N	7112	4642
Adj. R^2	0.0578	0.0608

Note: same as above.

6.3.3. Regression analysis of internal control quality and debt financing cost under different property rights

Table 6 divides the sample listed companies into non-state-owned enterprises and state-owned enterprises according to the nature of property rights.

According to the regression results in the table, in the grouping of non-state-owned enterprises, the quality of enterprise internal control and debt financing cost show a significant negative correlation (the significance level is 1%), and the coefficient is -0.0185 (t value is -2.90). This shows that in non-state-owned enterprises, the improvement of internal control quality has a significant effect on the reduction of debt financing costs. In the grouping of state-owned enterprises, the impact of internal control quality on debt financing cost is negative correlation, the coefficient is -0.0128, but the significance level is low, which is 10% (t value is -1.06). This shows that in state-owned enterprises, the improvement of internal control quality has less obvious effect on the reduction of debt financing cost. Hypothesis 3 is verified. It can be inferred that in non-state-owned enterprises, the debt risk is relatively high due to the lack of potential protection provided by administrative intervention. In this context, strengthening the quality of internal control has become an effective means for enterprises to reduce the cost of debt financing. Accordingly, we can draw a conclusion that compared with state-owned enterprises, improving the quality of internal control in non-state-owned enterprises has a more prominent impact on reducing the cost of debt financing.

Table 6. Regression results of internal control quality and debt financing cost under different property rights

Variable	（1）	（2）
	Non state owned enterprises	State-owned enterprise
CONSTANT	0.424***	0.412***
	(5.81)	(6.51)
IC	-0.0185***	-0.0128*

	(-2.90)	(-1.87)
SIZE	-0.00919***	-0.0114***
	(-4.22)	(-4.54)
LEV	-0.0749***	-0.0392***
	(-10.21)	(-4.20)
ROA	-0.0427***	-0.00249
	(-2.64)	(-0.12)
CFO	0.112***	0.109***
	(10.95)	(9.50)
GROWTH	0.00335	0.00807***
	(1.36)	(3.20)
TAT	-0.00292	-0.00955**
	(-0.71)	(-2.07)
IND	Yes	Yes
YEAR	Yes	Yes
N	7092	4662
Adj. R^2	0.0625	0.0607

Note: same as above.

6.4. Robustness check

In order to ensure the robustness of this study, the following three robustness test methods are adopted, and the test results are shown in Table 7:

In order to control the deviation of missing variables and improve the explanatory power of the model, the control variable asset collateral capability (APC) is added on the basis of the original model. The results are basically consistent with the assumptions in this paper.

Considering the rationality of the model and the limitations of the model, the replacement regression model is adopted, and the results are basically consistent with the assumptions in this paper.

In order to test the stability of the research results in different time intervals, the data in 2019 were removed and re analyzed, and the results were basically consistent with the assumptions in this paper.

Through the above three robustness test methods, the relationship between the main variables remains stable, and is consistent with the hypothesis in this paper, which further verifies the reliability and robustness of the research conclusion.

Table 7. Robustness test results

Variable	（1）	（2）	（3）
	Add control variable	Replace regression model	Excluding 19 years' data
CONSTANT	0.385***	0.355***	0.343***
	(8.00)	(11.66)	(6.17)
IC	-0.0163***	-0.0381***	-0.0169***
	(-3.47)	(-7.90)	(-3.17)
SIZE	-0.00888***	-0.00182***	-0.00667***
	(-5.39)	(-4.83)	(-3.47)
LEV	-0.0621***	-0.0394***	-0.0718***
	(-10.92)	(-14.43)	(-10.13)

ROA	-0.0290**	-0.0696***	-0.0280**
	(-2.26)	(-6.22)	(-1.97)
CFO	0.110***	0.107***	0.0977***
	(14.46)	(13.90)	(11.44)
GROWTH	0.00518***	-0.00317*	0.00900***
	(2.93)	(-1.69)	(4.72)
STATE	0.00277	0.00291***	0.00737*
	(0.87)	(3.58)	(1.74)
TAT	-0.00528*	0.00564***	-0.000641
	(-1.73)	(4.97)	(-0.17)
APC	0.0196***		
	(2.84)		
IND	Yes	Yes	Yes
YEAR	Yes	Yes	Yes
N	11754	11754	9744
Adj. R^2	0.0600	0.0660	0.0474

Note: same as above.

7. Research conclusions, suggestions and deficiencies

7.1. Research conclusion

This study selected A-share listed companies on the main board of Shanghai and Shenzhen from 2019 to 2023 as the research sample. After data collection and screening, a total of 11754 valid data were obtained. Among them, the internal control quality index of Dibo version is adopted, and the financial and non-financial data are from Tai'an database. With the help of Excel and stata17.0 tools for data processing and analysis. Firstly, descriptive statistics is carried out through empirical methods to reveal the distribution characteristics of the data; Secondly, correlation analysis was carried out to explore the correlation and strength among variables; Furthermore, we use regression model to test the negative impact of internal control quality on debt financing cost, and further compare the effect differences under different audit quality and property right attributes. The results show that the quality of internal control is significantly negatively correlated with the cost of debt financing. High quality internal control can effectively reduce the agent conflict, reduce information asymmetry, promote the rational decision-making of enterprises, protect the interests of creditors, and thus reduce the cost of debt financing. In addition, it is found that among enterprises with low audit quality, the effect of internal control quality in reducing costs is more prominent than that of enterprises with high audit quality. At the same time, in non-state-owned enterprises, due to the relatively weak supervision and administrative support, the effect of internal control quality on reducing debt financing costs is more significant than that of state-owned enterprises.

7.2. Policy recommendations

This study reveals the significant correlation between the quality of internal control and the cost of corporate debt financing. Therefore, the following implications are put forward for the practice of enterprise and market regulation:

At the enterprise level, first, we should improve the internal control system. It is necessary to carefully review the existing internal control framework, formulate an accurate and easy to implement internal control guidance manual, clearly explain the responsibilities and authorities of each department and position in the internal control system, and ensure that the internal control work is integrated into every link of the enterprise operation. In the procurement management process, all operating rules and approval steps are clearly formulated, covering multiple links such as submitting procurement applications, selecting suppliers, confirming procurement contracts, inspecting and storing goods, in order to prevent fraud and unnecessary waste of resources in the procurement process.

Second, strengthen enterprise implementation supervision. Establish an oversight group specifically responsible for the implementation of internal control, and the main responsibilities are assigned to the internal audit department or an independent risk management department. The team needs to carry out the audit and evaluation of the implementation effect of the internal control system according to the established cycle, so as to quickly identify the deviations and deficiencies in the implementation process of internal control, so as to formulate corresponding improvement measures according to these problems. Establish an incentive mechanism based on the implementation effect of internal control, and give honors and material rewards to departments and individuals that comply with internal control norms and perform outstanding implementation. For those who violate the internal control norms, strict accountability and appropriate punishment measures must be taken to enhance the attention of all staff to the internal control norms and the motivation for their implementation.

Third, attach importance to audit quality. In the process of selecting an audit institution, it is necessary to implement a thorough inquiry and evaluation procedure, focusing not only on the size and social reputation of the institution, but also on the in-depth analysis of its professional skills, operation experience in the industry, and in-depth understanding of the industry to which the specific enterprise belongs. In the audit process, we must focus on the independence of audit institutions, and we must avoid the choice of institutions that have interests with enterprises or may interfere with the audit independence.

At the market level, first, strengthen the guidance and supervision of financial institutions. Curb the negative phenomena such as out of control interest rate fluctuations and vicious market competition caused by the promotion of interest rate marketization. The deepening of the reform of interest rate marketization has promoted the rational optimization and allocation of financial resources, ensured that capital can be tilted to those enterprises with significant operating results and great development potential, and thus effectively reduced the cost burden of financing through debt for these enterprises.

Second, strengthen the coordination of financial supervision. Build a perfect financial supervision coordination system, and define the specific functions and responsibilities of different regulatory agencies in the process of enterprise management and financing, in order to eliminate the intersection of regulatory functions and regulatory blind spots. Strengthen the consistency of financial market regulation, build a fair, orderly and stable economic transaction field, so as to enhance the trust of investors and creditors in the financial trading place, reduce the uncertainty and potential risks encountered by enterprises in the process of raising funds, and achieve the goal of reducing the cost of debt capital of enterprises.

Third, improve the information disclosure system. Ensuring the clarity of information disclosure involves the specific content, standardized format, specified disclosure frequency and established evaluation criteria of the disclosed information. The information that enterprises should be required to disclose should not only cover financial data, but also include detailed information in non-financial fields, such as corporate strategies, risk control strategies and internal monitoring mechanisms. The specific requirements for information disclosure are refined to enhance the transparency and readability of information, so that investors and creditors can obtain a comprehensive and accurate understanding of the current situation and future development trend of enterprise operations.

7.3. Research deficiencies and Prospects

This paper draws the corresponding conclusions through empirical research, which has reference significance to a certain extent, but there are still some shortcomings.

First, the assessment of audit quality is incomplete. This analysis uses whether the accounting firm belongs to the top ten accounting firms as the proxy variable of audit quality. Although it can reflect the difference of audit quality to some extent, it is not complete. The top ten accounting firms also have different levels of audit quality, and their audit quality cannot be judged to be excellent only because they belong to the top ten accounting firms. The business of the firm, the professionalism and work attitude of auditors and other factors will affect the quality of the actual audit project. Audit quality is also affected by various factors, such as the depth of implementation of audit procedures, auditor autonomy, familiarity with the industry in which the enterprise is located, and these factors cannot be reflected by the single variable of whether it belongs to the top ten accounting firms.

Second, the one sidedness of debt financing cost assessment. When evaluating the cost of debt financing, this study uses the index of the proportion of annual interest expenditure to interest bearing liabilities, and mainly focuses on the explicit cost of debt financing, namely interest expenditure. Debt financing also has many hidden costs, such as the guarantee fees paid by enterprises to obtain debt financing, the opportunity cost of mortgage assets, and the potential losses caused by the increase of financial risks caused by debt financing. These hidden costs also play an important role in the financing decision-making and financial situation of enterprises in practice. However, this study can not include them in the scope of debt financing cost assessment, resulting in a lack of comprehensive understanding and discussion of debt financing costs, which may affect the degree to which the research results reflect the real financing costs of enterprises.

The third is to simplify the complex relationship between variables. In the process of building the model, the relationship between variables is simplified to some extent. As a matter of fact, the relationship between audit quality, internal control quality and debt financing cost is not a simple linear relationship. They may have a complex mechanism of interaction and mutual effect. High quality internal control is conducive to enhancing audit efficiency and effect, so as to improve audit quality. And the improvement of audit quality also promotes enterprises to optimize the internal control system. The change of debt financing cost also interferes with the investment decision of enterprises on internal control and audit quality. This research model can not fully evaluate the complex interaction between these variables, which may cause the research results to have insufficient ability to explain the reality.

Nowadays, the wave of digital transformation in China has been rapidly promoted and gradually moved to a deeper level. With the improvement of enterprise data governance system, it is believed that the relevant data of such research will be more abundant and detailed in the future, so it will better help scholars to carry out more in-depth and complete research.

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